Nonmotorized Planning and Design Report

Bicycle and Pedestrian Improvements/
Proposed SR 520 Bike/pedestrian Path

Prepared for

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1. INTRODUCTION

1.1 TASK PURPOSE

This report describes bicycle and pedestrian facilities improvements that have been considered and are proposed as part of the SR 520 corridor redevelopment. Improvements are intended to increase mobility through the corridor by providing means for nonmotorized travel and motorized-nonmotorized combinations. Nonmotorized facilities improvements can also enhance the livability of communities by providing recreational trails and commuter trails for alternatives to driving. Bicycle and pedestrian transportation routes such as these were identified as community assets and desirable enhancements during community design workshops conducted in November 2000. Communities along the SR 520 corridor declared that "*the ability to walk and ride bicycles around the neighborhood to parks, community facilities, and commercial areas is important. Safety should be addressed and walkways and trails enhanced*" (p. 2-5, Preliminary Draft Lidding Options and Opportunities Evaluation Report).

The bicycle/pedestrian trail improvements proposed here will be considered as part of the highway interchange alternatives considered in the EIS. The proposed improvements were the culmination of a planning and design process that included:

- Solicitation of public input through participation in community design workshops and attendance at open houses;
- Review of existing conditions;
- Coordination with local bicycle/pedestrian coordinators and local nonmotorized transportation plans, including Puget Sound Regional Council, Seattle Transportation, Seattle Bicycle Advisory Board, Seattle Pedestrian Advisory Board, Redmond Parks, Redmond Transportation, University of Washington, King County Parks, Bellevue Transportation, and the Bike Alliance;
- Development of requirements and design standards for shared-use path system;
- Close coordination with the roadway design team.

The preliminary recommendations described in this report precede the final selection of interchange options for the whole of SR 520. Designs for the Montlake and I-5 interchanges have not been resolved, so the proposals made for nonmotorized routes at these locations are not fully detailed yet. When the highway interchange alternatives are selected, the bike/pedestrian path proposals can be expanded. [Note: "bike/pedestrian" and "nonmotorized" are used interchangeably in this report.]

1.2 GOALS AND REQUIREMENTS

The redevelopment of the SR 520 corridor is an exceptional opportunity to complete an important physical link in the regional nonmotorized transportation system. Accordingly, the primary goal of the proposed bicycle/pedestrian facilities improvements is to create an integrated shared-use trail system that links important destinations (employment centers, community facilities, commercial centers, and neighborhoods) and connects seamlessly to other trails. It is intended for commuters and recreational bicyclists and consequently must meet specified design

and safety standards. This section discusses the goals that motivate the selection and the standards that define the design of the nonmotorized transportation routes.

The SR 520 corridor spans two major water bodies and seven jurisdictions. It has the potential to connect the three longest regional trails (Burke Gilman Trail, Lake Washington Loop Trail, and Sammamish River Trail) as well as many shorter trails (Points Loop, Bridle Crest Trail, Puget Power Trail, and the I-90 Trail). In addition, several planned trails of significant length will one day connect to the SR 520 corridor. They are Redmond's East Lake Sammamish Trail, the Bear Creek Trail and Greenway, and the Burlington Northern Santa Fe Railroad right-of-way from Bellevue to Kirkland. Figures 1, 2 and 3 illustrate these existing and proposed trails.

In order to create a viable alternative to driving and a genuine community enhancement a nonmotorized transportation system in the SR 520 corridor should have three basic elements:

1. A *continuous* bicycle/pedestrian path that parallels SR 520 from its beginning in Redmond to its terminus at I-5. This means bridging Lake Washington.
2. Effective cross-corridor routes and connections between neighborhoods and other regional facilities.
3. Connections to transit facilities.

A continuous, dedicated shared-use path for bicycles, pedestrians, skaters, and joggers parallel to SR 520 would provide a much-needed link for commuting between Seattle and the Eastside communities, and to the Overlake/Microsoft employment center in Redmond. The trail would add almost fourteen miles to the Burke-Gilman/Sammamish River Trail system and close the loop around the north end of Lake Washington, creating a total of nearly forty-one miles of paved trail.

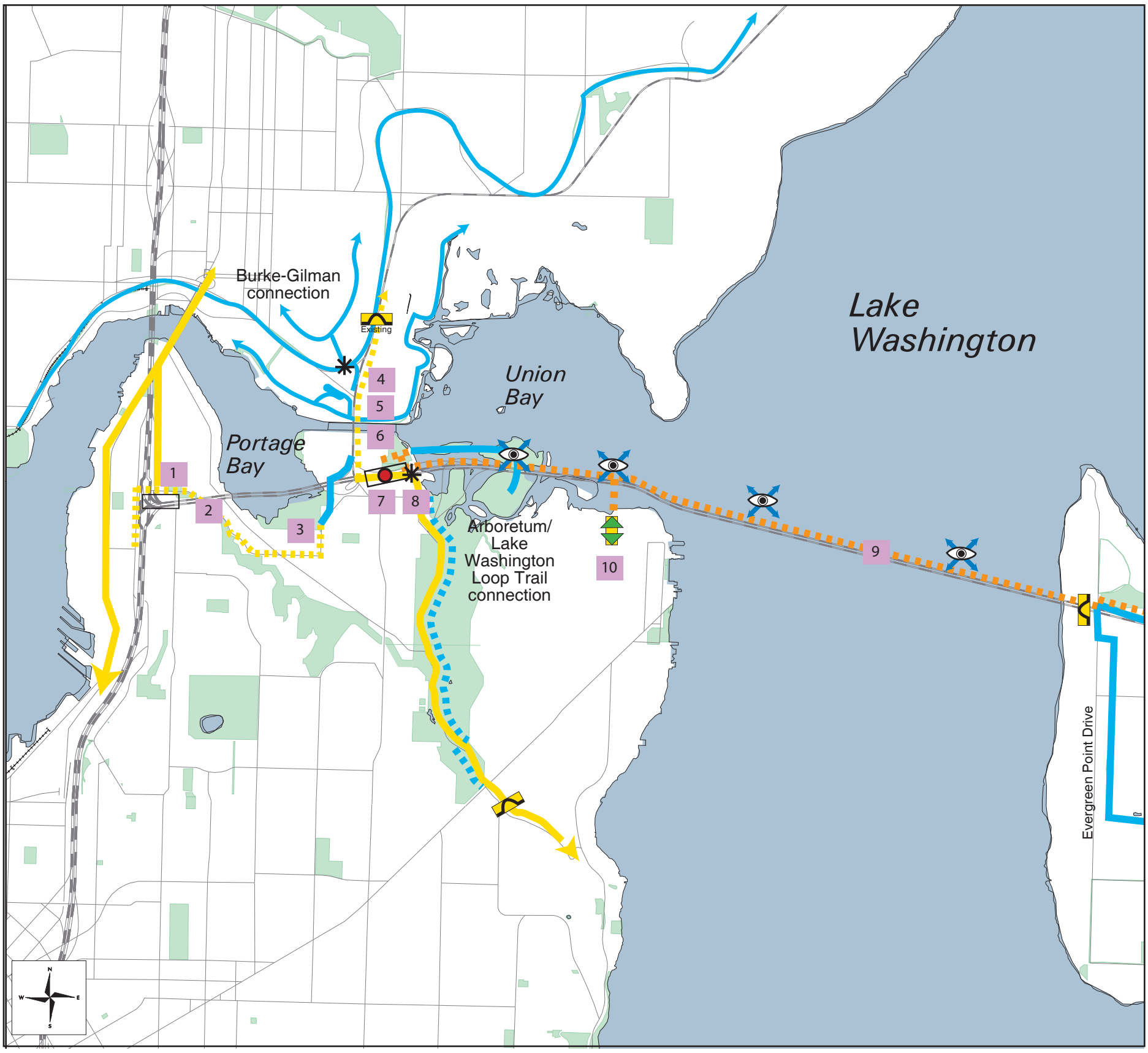
Cross-corridor routes and connections, such as bridges, underpasses, and routes that intersect with the corridor, provide connections between on-street bike lanes, walkways, and trails outside of the SR 520 corridor. These connections integrate the SR 520 trail with the surrounding street network and provide safe, direct connections between the SR 520 trail and transit facilities such as park and ride lots, transit centers, and HCT stations. Connections to transit facilities are crucial for encouraging alternatives to driving.

The trails should be safe and inviting routes for bicycles and pedestrians. Where possible, bike storage, informational signage, telephones, and lighting should be provided to increase safety, comfort, and convenience. There are agreed-upon standards that prescribe how to accomplish this and these standards, described below, will be applied to this trail system.

Additional improvements outside the SR 520 right-of-way will be necessary to make the system work. Planning and designing these on-street improvements will require coordination with bicycle/pedestrian program and trail planners from each jurisdiction.

Trans-Lake Washington Project

Conceptual Nonmotorized System Map
Eastlake & Montlake Neighborhoods



LEGEND

- Parks and other public areas
- Interstate or US Route
- State Route
- Other Route or Road
- Railroad
- Existing SR 520 Bikeway
- Proposed SR 520 Trail
- Existing regional or local trail
- Planned regional or local trail
- Existing on-street ped/bike route
- Proposed on-street ped/bike improvement
- Existing transit facility or Park & Ride
- Existing flyer stop
- Grade-separate crossing (proposed unless noted otherwise)
- Access point to SR 520 Trail
- Proposed connection to other trail
- Possible lid
- Proposed viewpoint/pull-out

Please refer to conceptual interchange plans for more detailed drawings of proposed improvements

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PROPOSED IMPROVEMENTS

EASTLAKE

1. Create bike/ped path on lid or on-street safety improvements
   Roanoke between Delmar & Boylston
2. Create on-street bike lanes
   Delmar between 11th & Boyer

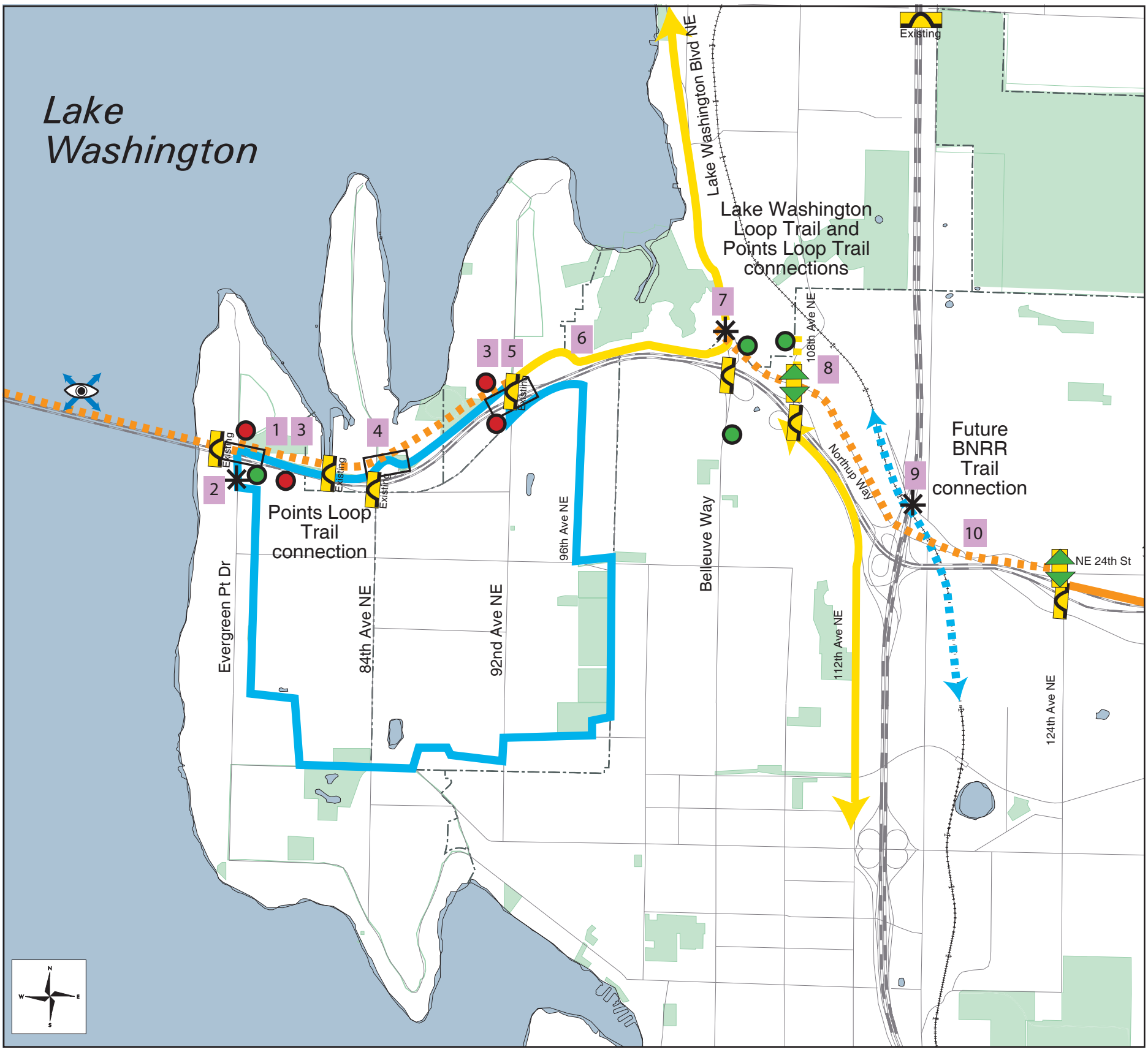
MONTLAKE

3. Upgrade trail and connections
   Bill Dawson Trail - Montlake Playfield to NOAA
4. Make safety improvements
   Montlake Blvd between SR 520 and HEC Ed. overpass
5. Improve crossing of Montlake Cut
6. Improve connection between SR 520 and Montlake Bridge
   on-street on Shelby/Hamlin or MOHAI site
7. Redesign Montlake Flyer Stop, connect with bike/ped lane
8. Create connection to proposed Arboretum Trail
9. Create bike/ped path on SR 520 bridge with viewpoint/ pull-outs
   Foster Island, Madison Park (see below), 2-3 on bridge
10. Create ramp from bike/ped path to Madison Park
    via 38th Ave E , 39th Ave E, or Canterbury Ln E

Figure 1

Trans-Lake Washington Project

Conceptual Nonmotorized System Map
Evergreen Point to I-405



LEGEND

- Parks and other public areas
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- Existing SR 520 Bikeway
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- Planned regional or local trail
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- Proposed on-street ped/bike improvement
- Existing transit facility or Park & Ride
- Existing flyer stop
- Grade-separate crossing (proposed unless noted otherwise)
- Access point to SR 520 Trail
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- Possible lid
- Proposed viewpoint/pull-out

Please refer to conceptual interchange plans for more detailed drawings of proposed improvements

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PROPOSED IMPROVEMENTS

EVERGREEN POINT TO BELLEVUE WAY

1. Maintain off-street trail parallel to SR 520
   new or improved trail, from Evergreen Point to Bellevue Way
2. Connect SR 520 bike/ped path to Points Loop Trail
3. Connect SR 520 bike/ped path to flyer stop(s), if altered
   Evergreen Point, 92nd Ave NE
4. Make safety improvements to trail/road crossing
   84th Ave NE & Points Loop Trail
5. Make safety improvements to trail/road crossing
   92nd Ave NE & Points Loop Trail
6. Modify barrier to improve bicycle access
   NE Points Drive

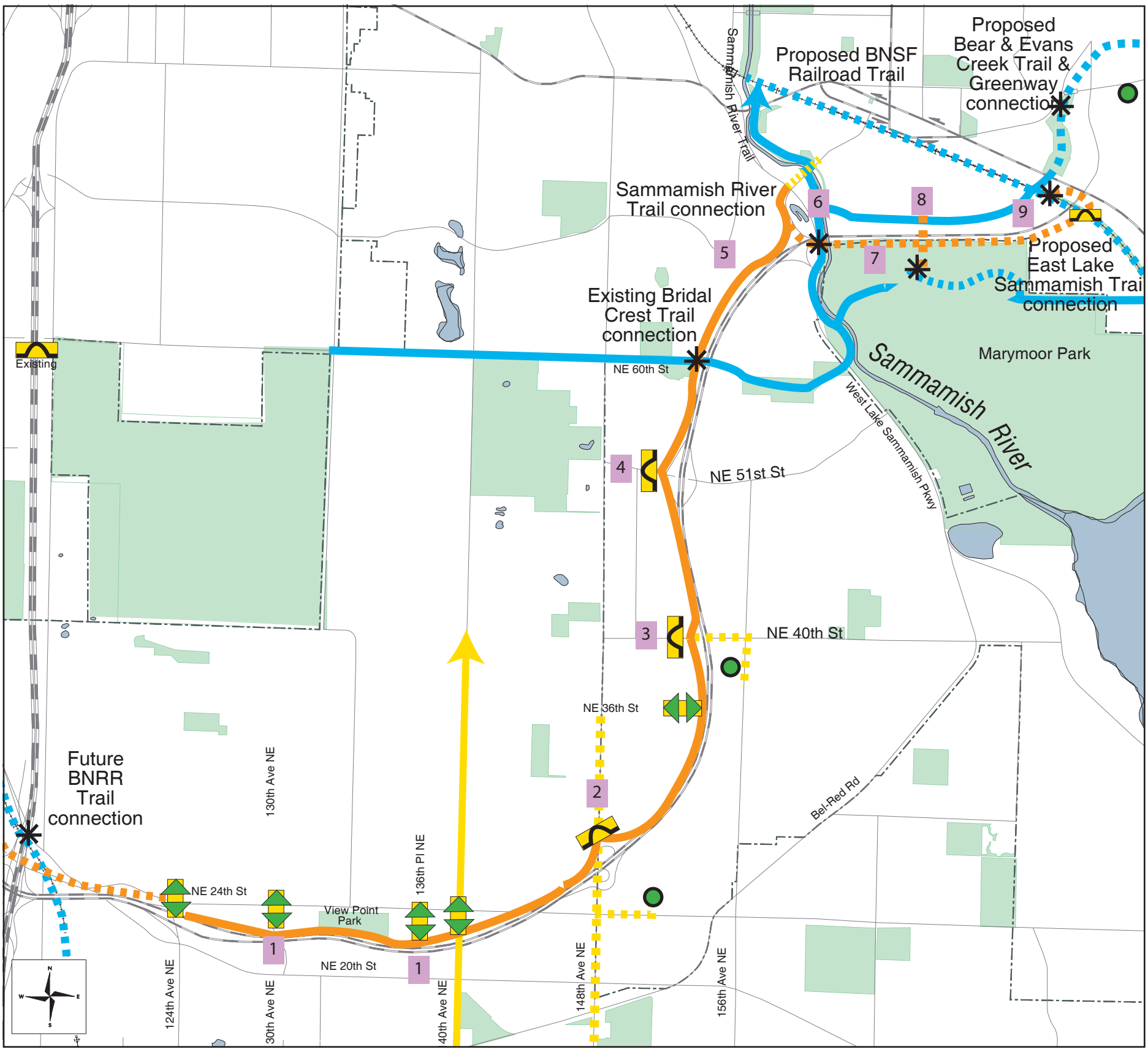
BELLEVUE WAY TO I-405

7. Make safety improvements or create grade-separated crossing
   Bellevue Way & SR 520 bike/ped path
8. Create access point & on-street connection
   108th Ave NE to South Kirkland Park & Ride
9. Ensure connection/access point to future BNRR trail
10. Extend SR 520 bike/ped path from existing terminus
    NE 24th St to Bellevue Way interchange

Figure 2

Trans-Lake Washington Project

Conceptual Nonmotorized System Map
I-405 to Redmond



LEGEND

- Parks and other public areas
- Interstate or US Route
- State Route
- Other Route or Road
- Railroad
- Existing SR 520 Bikeway
- Proposed SR 520 Trail
- Existing regional or local trail
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- Proposed on-street ped/bike improvement
- Existing transit facility or Park & Ride
- Existing flyer stop
- Grade-separate crossing (proposed unless noted otherwise)
- Access point to SR 520 Trail
- Proposed connection to other trail
- Possible lid
- Proposed viewpoint/pull-out

PROPOSED IMPROVEMENTS

I-405 to WEST LAKE SAMMAMISH PARKWAY (WLSP)

1. Create trail access
   SR 520 Bikeway @ 136th and 140th Ave NE or 130th Ave NE
2. Create grade separated crossing at interchange
   SR 520 Trail @148th Ave NE
3. Create grade separated crossing at interchange
   SR 520 Trail @ NE 40th St
4. Create grade separated crossing at interchange
   SR 520 Trail @ NE 51st St
5. Add vegetated buffer
   SR 520 Trail between West Lake Sammamish Parkway & NE 51st St

WEST LAKE SAMMAMISH PARKWAY TO SR 202

6. Create bike/ped crossing of Sammamish River
   Sammamish River Trail @ West Lake Sammamish Parkway interchange
7. Add bike/ped lane to SR 520
   Between WLSP and NE 70th or proposed East Lake Sammamish Trail
8. Create bike/ped crossing of SR 520
   Between Marymoor Park and Redmond Town Center
9. Create grade separated crossing at interchange
   Redmond Way/SR 202/East Lake Sammamish Trail

Please refer to conceptual interchange plans for more detailed drawings of proposed improvements

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Figure 3

1.2.1 Trail Design Standards

Two of the primary considerations are personal safety and comfort on the trail. Trail attributes that determine safety and comfort are visibility, paving, grade or slope, signage, protective barriers, etc. The WSDOT Design Manual includes standards and specifications for all aspects of trail design that address safety and comfort, and this project adheres to those standards. Indeed, most regional trails throughout the Puget Sound conform to these design standards or similar ones such as the AASHTO *Guide for Development of Bicycle Facilities* (1999).

The WSDOT Design Manual defines a shared-use path as one that *"... is designed and built primarily for use by bicycles but is also used by pedestrians, joggers, skaters, wheelchair users (both motorized and nonmotorized) and others*" (p. 1020-2, May 2001). Because SR 520 trail system is mainly intended to serve commuters, the proposed SR 520 bike/pedestrian path will meet WSDOT Design Manual's shared-use path standards for Bicycle Facilities (1020, May 2001). The following trail standards are recommended:

Trail alignment and Impacts

The trail should be aligned within the SR 520 right-of-way and should run parallel to the highway wherever possible. The trail should be also be designed to avoid or minimize impacts to sensitive areas such as wetlands, streams, critical slopes areas, etc.

Buffers, Views, and Access to Special Features

Though intended for commuters, the proposed SR 520 bike/pedestrian path should be designed to be sensitive to its context, with consideration for scenic value, and erosion and slope stability. Access to parks and other special features should be provided. Wherever possible, the trail should be aligned to maximize the buffer between the highway and the trail for safety and aesthetic reasons. The recommended outer separation between a shared-use path and a highway is 5' to the edge of the roadway. A physical divider is required for posted speeds of over 35 mph and fences should be at least 4.5' high. Where possible, buffers should be thickly planted with low-maintenance native trees and shrubs.

Width and clearance

Following the precedent set by King County, a 12' paved trail with 1-foot minimum gravel shoulders on each side is proposed (Figure 4). A minimum clearance of 2' on each side from signs, vegetation, fences, walls, utilities, etc. with a recommended maximum slope of 1:6.

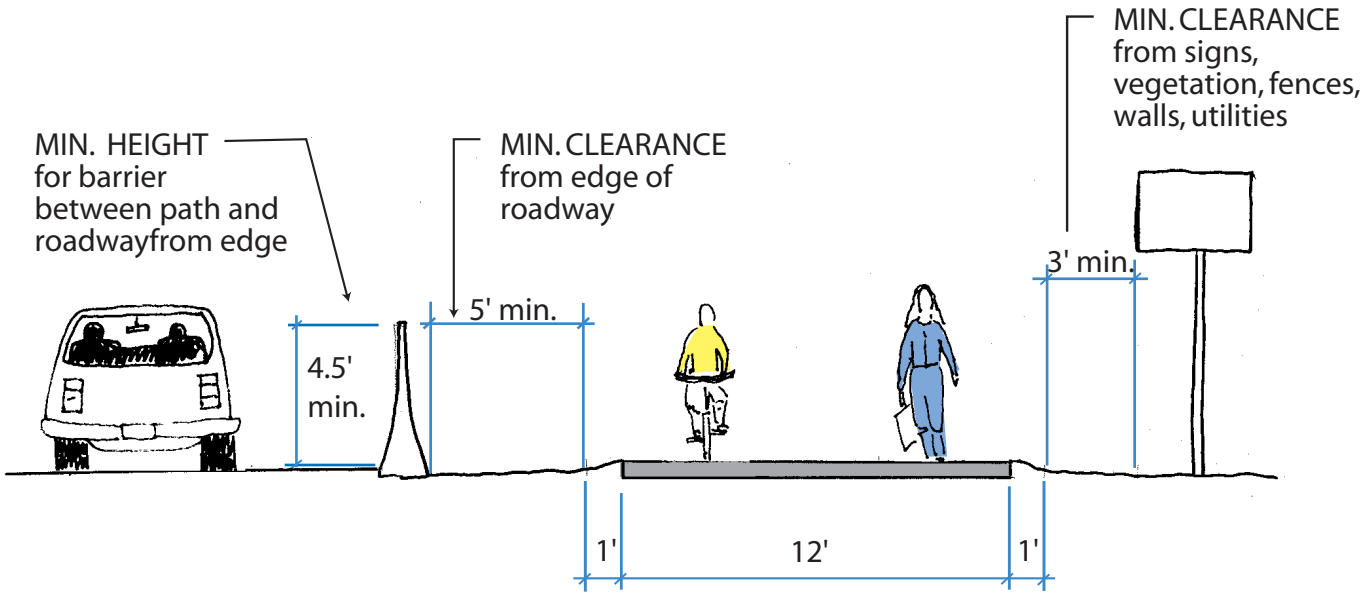
Design Speeds and Turning Radii

In open terrain, the trail should be designed for a minimum design speed of 20-mph (30 km/hr), with a minimum curve radius of 65 feet. For down grades of less than 4% slope but longer than 500', a design speed of 30 mph and minimum curve radius of 145' are recommended.

Horizontal alignment

A 2% cross slope is recommended.

Typical Trail Cross-Section



WIDTH OF SHARED USE PATH

2% cross-slope recommended for paved area
1:6 max. slope for shoulders

Drawings not to scale
Plans represented are conceptual only

Grades

AASHTO recommends the following grade restrictions and lengths:

2%	for 800 ft or longer
5-6%	for up to 800 ft (240 m)
7%	for up to 400 ft (120 m)
8%	for up to 300 ft (90 m)
9%	for up to 200 ft (60 m)
10%	for up to 100 ft (30 m)
11%	for up to 50 ft (15 m)

Path-roadway intersections, path-interchange areas

Wherever possible the crossings of the proposed SR 520 bike/pedestrian path with major roads and interchange areas shall be grade separated, that is, the path shall be at a different level than the highway or road.

Lighting

Following precedents set by other major regional trails the proposed SR 520 bike/pedestrian path will not be lit.

Signage

Wayfinding and safety signage is vital to ensuring the success of the proposed SR 520 bike/pedestrian path and will be addressed in the detailed design phase. Wayfinding signage is necessary to tie together the on-street segments, provide information about trail connections and important destinations.

Other standards

Standards that specify sight distance, drainage, traffic signals, bollards, and structures (overpasses, underpasses, bridges, etc.) are in the WSDOT Design Manual section on Bicycle Facilities and the AASHTO Guide for the Development of Bicycle Facilities. These are detail elements that will be addressed in the design phase and after the preferred alternatives have been selected.

2. EXISTING CONDITIONS

The Evergreen Point Floating Bridge poses the greatest challenge for cyclists and pedestrians traveling between Seattle and the eastside communities. Because there is no bike/pedestrian path crossing the lake in parallel with SR 520 bicyclists and pedestrians must use the bus to cross the lake. On *terra firma* many trails for bicycle/pedestrian connections already exist within the SR 520 corridor, however they are not directly connected to one another. On the west of Lake Washington, cyclists and pedestrians can reach the SR 520 corridor via several trails and surface streets, but no dedicated off-street network exists. On the eastside of Lake Washington, cyclists and pedestrians can travel for longer stretches on paved off-road trails within the corridor, but not continuously. Figures 1 through 3 illustrate the existing trails in these communities.

Existing conditions for each community are unique and are described in the following sections. These conditions were determined through field investigation, review of local bicycle and pedestrian plans, and meetings with bicycle/pedestrian program coordinators and trail planners from the various jurisdictions.

2.1 SEATTLE AND LAKE WASHINGTON

The west side of Lake Washington and the Seattle portion of SR 520 have numerous on-street, informal bike/pedestrian connections but the network they form is labyrinthine and occasionally unsafe--for the bicyclist in particular. This is an area of steep terrain, a large water body (Portage Bay), and a dense urban grid of streets of all types. Residential communities are right against the highways, along with schools, parks, and commercial areas. Both the I-5 interchange and the Montlake bridges are busy, important crossroads linking Capital Hill, Eastlake, Montlake and the University District.

2.1.1 Eastlake/Capitol Hill/Portage Bay

This is a very important hub for traveling between the Capital Hill-Eastlake areas and the west side of the University. Bicycles and pedestrians use surface streets to move along or across the SR 520 corridor in Seattle's Eastlake and Montlake neighborhoods. Bicyclists commonly user Boyer Avenue E., E. Lynn and 18th Avenue E. to get from Capitol Hill to Montlake, and then Delmar Avenue and Interlaken to reach the Lake Washington Loop Trail via the Arboretum.

2.1.2 Montlake

The Montlake overpass is the only north-south connection across SR 520 on the west side of Lake Washington. Bicyclists and pedestrians can access the Montlake interchange via the Lake Washington Loop Trail, the Arboretum Trail, and Burke-Gilman Trail. The Bill Dawson Trail runs under SR520 along the west side of Montlake Boulevard to connect the Montlake Playfield (south of SR 520 on Portage Bay) and NOAA (north of SR 520).

The eastbound Montlake flyer stop, located under the Montlake Boulevard overpass within eastbound lanes of the highway facility, is a major hub for transit-users traveling between downtown Seattle, the UW, and Eastside destinations. The stop is reached by stairs on both the east and west sides of the Montlake Boulevard. Westbound transit-riders use a different bus stop north of the highway and adjacent to the Montlake off-ramp. The flyer stop is problematic for a

number of reasons, but its primary flaw is that the stop is not accessible to disabled riders. It offers a very spare shelter, benches, and minimal Metro schedule information. Noise, the proximity of high-speed vehicular traffic, and vehicle exhaust make waiting for the bus an unpleasant experience.

2.1.3 Lake Washington

Cyclists must mount their bicycles on Metro buses to cross the Evergreen Point Floating Bridge, or park and lock their bikes at the racks on Montlake Avenue adjacent to the surface bus stop on Montlake Boulevard. Metro buses can carry only two bicycles at a time on racks mounted on the front of the bus. The number of cyclists wanting to cross the bridge often exceeds the capacity of buses to carry them. During morning peak travel hours, cyclists who intend to get off at the Evergreen Point and Yarrow Point flyer stops may board the many empty east-bound buses that pass through the Montlake flyer stop on their way to Metro's east bases. On the other hand, cyclists who want to take a specific bus may find that the bike-rack on the bus they want to take is full, obliging them to wait until an empty bike rack arrives.

During the afternoon peak travel hours, the situation is reversed. Cyclists who want to board buses from surface streets earlier in a bus's route are more likely to find space on the bike rack than are cyclists waiting at the west-bound flyer stops. On fair weather days, cyclists waiting at the flyer stops in the afternoon may have to wait between 10 and 30 minutes until a bus with space in its bike rack arrives. It can be particularly frustrating for cyclists waiting for a specific bus, rather than just any bus that get them across the bridge.

2.2 POINTS COMMUNITIES, BELLEVUE, REDMOND

This is an area of rolling terrain and a semi-rural quality to the neighborhoods. Houses are on spacious lots and for the most part separated from the freeway by wide, wooded buffers. Two large park/open space areas are connected by a continuous, if indirect, bicycle/pedestrian path that extends from the Evergreen Pt. Road flyer stop to Bellevue Way. It is possible to make one's way eastward along surface roads but for long stretches there is no designated bike lane. Figures 2 and 3 illustrate the existing trails in this area.

2.2.1 Evergreen Point to Bellevue Way NE

The Points Loop Trail is a grade-separated, off-road path that runs parallel to SR 520 on the north side of the highway between 92nd Avenue NE and Evergreen Point Road. It crosses 84th Avenue NE/Hunts Point Road at grade and Medina Creek over a covered bridge. The trail provides access to the westbound flyer stops near 92nd Avenue NE and Evergreen Point Road. North-south connections can be made via a non-ADA accessible footbridge that spans the highway from the elementary school to the Hunts Point Park, and overpasses at 84th and 92nd Avenues NE. These connections also provide access to the eastbound flyer stops connections.

The segment of the Points Loop Trail adjacent to SR 520 is 8-10' wide, paved with asphalt, and separated from the highway and adjacent properties by a chain link fence. Because of the rolling topography of the area, trail grades exceed 5% in several areas. The trail winds through a vegetative buffer that greatly enhances the trail experience despite the fact that the vegetation adjacent to the trail has heaved the asphalt and is not regularly trimmed back. Views of the

highway are blocked or screened, the trail is partially shaded, and the native vegetation provides visual interest.

In addition to the Points Loop Trail, NE Points Drive serves as a bicycle connection between Lake Washington Boulevard NE/Bellevue Way NE and the Points Loop Trail. At the Yarrow Point city limit (near 96th Avenue NE) the street is closed to auto traffic by a brick and bollard structure that leaves a very narrow passage open for cyclists.

The existing transit flyer stops at Evergreen Point and 92nd Avenue NE suffer from many of the same design flaws (noise and exhaust) as the Montlake flyer stop. Visibility is an additional problem; buses are generally traveling past these stops at higher speeds, and it can be difficult for bus drivers to see whether there are people waiting.

2.2.2 Bellevue Way to 124th (I-405)

There is currently no dedicated bicycle route between Bellevue Way NE and 124th Avenue NE along the SR 520 right-of-way or Northup Way. It is possible to bike along Northup Way to City of Bellevue connections but the road is narrow, winding, and does not have striped bike lanes.

2.2.3 I-405 to West Lake Sammamish Parkway

The recently completed SR 520 Bikeway lies within the SR 520 right-of-way between West Lake Sammamish Parkway and 148th Avenue NE. The Bikeway is a 10' wide, grade-separated, asphalt trail that runs along the north side of SR 520 at a fairly consistent grade. It is separated from the highway and adjacent properties by a 6' tall chain link fence. The trail meets functional standards, but the travel experience and to some degree the safety of the trail are degraded due to a lack of buffering vegetation, full views of the highway, lack of regular access points, and at-grade crossings of busy north-south streets (some as wide at eight lanes).

An extension from 148th Avenue NE to NE 24th Street began construction in the fall of 2001. There is no planned connection between the SR 520 Bikeway and the Point Loop Trail at this time. Cyclists and pedestrians must travel on curbside sidewalks (where they exist) along Northup Way under 1-405 between 124th Avenue NE and Bellevue Way NE.

2.2.4 West Lake Sammamish Parkway to SR 202

The SR 520 Bikeway currently terminates at the intersection of West Lake Sammamish Parkway and Leary Way NE. The City of Redmond is planning to make on-street improvements to Leary Way from West Lake Sammamish Parkway to the Sammamish River that will connect the SR 520 Bikeway and the Sammamish River Trail. Bicyclists currently use the Sammamish River Trail and West Lake Sammamish Parkway for north-south travel. The Bear Creek Trail on the north side of Bear Creek is the main east-west connection between the Sammamish River Trail and the BNSF Railroad right-of-way.

3. PROPOSED IMPROVEMENTS

For each of the communities and neighborhoods adjacent to the highway, proposed improvements are described in terms of the three basic nonmotorized system goals described in Section 1: continuous facility, cross-corridor connections, and transit connections. The bicycle/pedestrian connections that can be made in these areas will depend on the interchange designs selected. The proposed improvements are described below.

3.1 SEATTLE AND LAKE WASHINGTON

The goal for nonmotorized travel in the Seattle-Lake Washington areas is to better link the Eastlake, north Capitol Hill, Roanoke Park, Fuhrman/Boyer and west Montlake neighborhoods through a combination of small connective pieces: on-street improvements, cross-corridor connections, and bike/pedestrian paths on lids, if constructed. Figure 1 illustrates the locations for proposed nonmotorized improvements for this area.

Continuous facility

The complexity of the I-5/SR 520 interchange, the density of the urban fabric, the hilly topography of this area, and the Portage Bay Viaduct pose constraints that make the design of a continuous off-street facility challenging. Grades on the proposed Portage Bay Viaduct exceed recommended standards for safe bicycle travel, therefore a separate bike/pedestrian path on the viaduct is not recommended. The concern is less for the climbing (westbound) grade and more for the descending (eastbound) grade, as cyclists could reach speeds that could compromise the safety of other trail users.

If the Lakeview off-ramp of northbound I-5 were to be rebuilt, it would provide a good opportunity for additional north-south nonmotorized connectivity. The existing "Melrose Connector" could be extended alongside or under a rebuilt Lakeview ramp, and connect to Eastlake where Boylston crosses under I-5.

To improve east-west connections, one option would be to construct a bike/pedestrian path in the open space south of SR 520 between the vicinity of 11th Avenue E/E Interlaken Boulevard and Lakeview Blvd E, if the topography would accommodate it. Bike/pedestrian paths on a lid between Delmar and 10th Avenue could also provide east-west connections and connect the Roanoke Park area and north Capitol Hill. Issues to be resolved here include how to keep path and street grades separate, steep grades, connecting to existing paths.

Striped bike lanes on Delmar would facilitate bicycle travel between Eastlake and Montlake by providing a dedicated path to the lower-volume local streets in the Montlake area. Improvements to the Bill Dawson Trail between the Montlake Playfield and NOAA would enhance the link between the west Montlake neighborhood, Eastlake, North Capitol Hill, SR 520, and the UW. Pedestrian access to Portage Bay could be enhanced by creating pathways in the open space adjacent to the viaduct, and by creating a boardwalk along the waterfront between the viaduct and the Montlake Playfield.

Cross-corridor connections

Roanoke Street is the primary cross-corridor connection in this area, linking Eastlake and North Capitol Hill. Cyclists use the main thoroughfares (Eastlake and Harvard) parallel to I-5 for north-south travel. Enhancing the east and west connection across I-5 via a widened Roanoke bridge or lid would benefit bicyclists, pedestrians, and the pupils at Seward School who use the corridor to reach Roanoke Park.

The intersections of Roanoke at Boylston, Harvard and 10th Avenue E. are currently unsafe obstacles for pedestrians. High traffic density, lengthy signals, and poor visibility contribute to the difficulty of crossing Roanoke to connect with the east-west path. Ideally, a continuous path from 10th to Boylston and across Roanoke would be built so that path users could avoid the intersections. At a minimum, safety improvements such as additional crosswalks, improved signal timing, possibly limiting some vehicular turning movements and an additional crossing of Harvard Avenue E. should be considered.

Transit connections

The Eastlake area is the crossroads between the major hubs of downtown and Montlake and is therefore not designated as a hub for nonmotorized transportation. The need for a bus stop along this section of SR 520 has not been identified.

3.2 MONTLAKE

The Montlake area is a vital bicycle, pedestrian, and transit hub for both recreational and commuting traffic between downtown Seattle, the eastside communities, the UW, the Burke-Gilman Trail, the Washington Park Arboretum and several other important open spaces in the area. The two primary goals are to develop a parallel bicycle/pedestrian path and enhance existing nonmotorized commuting and recreational pathways. Figure 1 shows proposed nonmotorized improvements for this area.

Continuous facility

The continuous east-west facility would span Lake Washington on the north side of the SR 520 floating bridge. This is primarily because of weather conditions (see Lake Washington section, below) but makes direct connections to the UW, the Museum of History and Industry (MOHAI), and the Burke-Gilman trail.

Cross-corridor connections

The critical connections to be made at Montlake and options for making these connections are described below. Figures 5, 6, and 7 illustrate options for improving these connections.

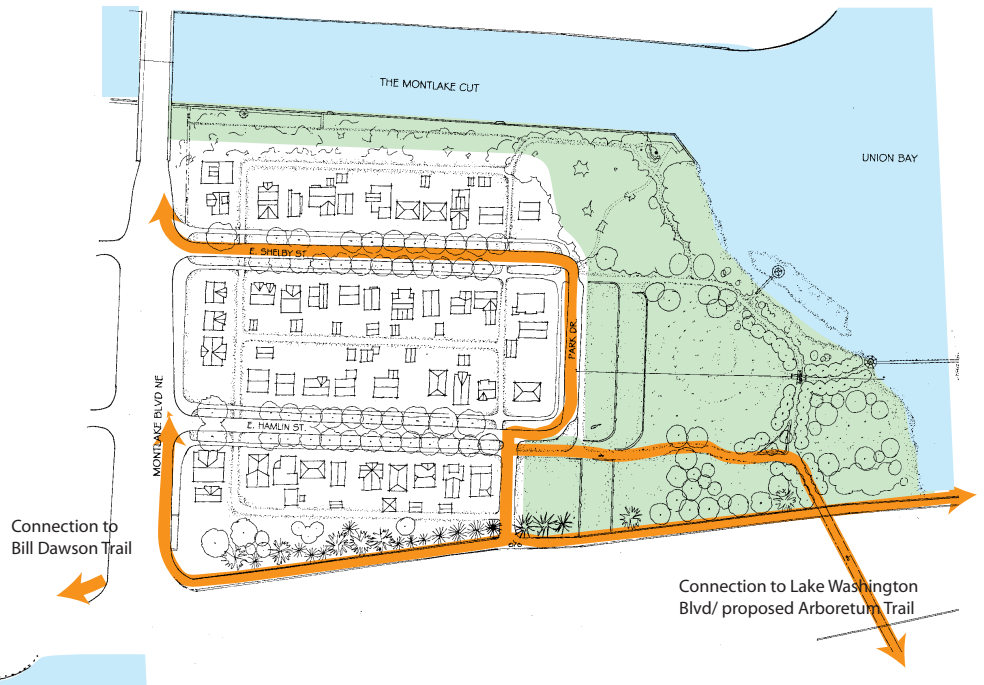
<u>East-west Connections</u>

Between Capitol Hill and the UW, via the proposed SR 520 bike/pedestrian path and the Bill Dawson Trail from the Montlake Playfield to NOAA and the UW.

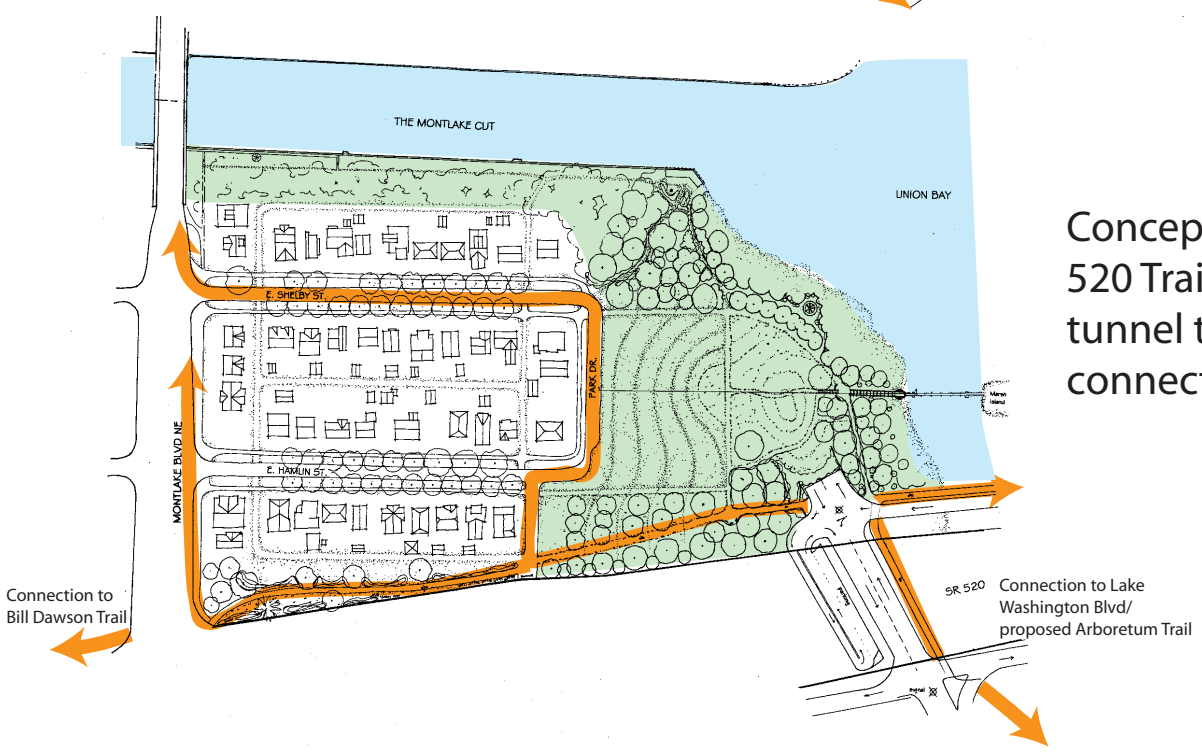
Nonmotorized System Opportunities
Montlake Area

Concepts for improved bike/ped connections between 520 and Montlake Bridge

Concept Alternative 1
520 Trail parallel to mainline, on-street connections to bridge



Concept Alternative 2
520 Trail crossing mainline and tunnel to Pacific Street, on-street connections to bridge



Concept Alternative 3
Narrow central median and add bike lanes on Montlake Blvd, shown without bus lane (left) and with bus lane (right)

Existing conditions, Montlake Blvd - without bus lane (left) and with bus lane (right)

Drawings not to scale
Plans represented are conceptual only

Trans-Lake Washington Project

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Figure 5

Nonmotorized System Opportunities
Montlake Area

Concepts for improved bike/ped crossing of Montlake Cut

Concept Alternative 1
Add bike/ped lane to Montlake Bridge

Concept Alternative 2
Dedicated bike/ped bridge across Montlake Cut

Concept Alternative 3
Bike/ped lane on proposed bridge to Pacific Street

Drawings not to scale
Plans represented are conceptual only

Trans-Lake Washington Project

Fig5-ML.ai
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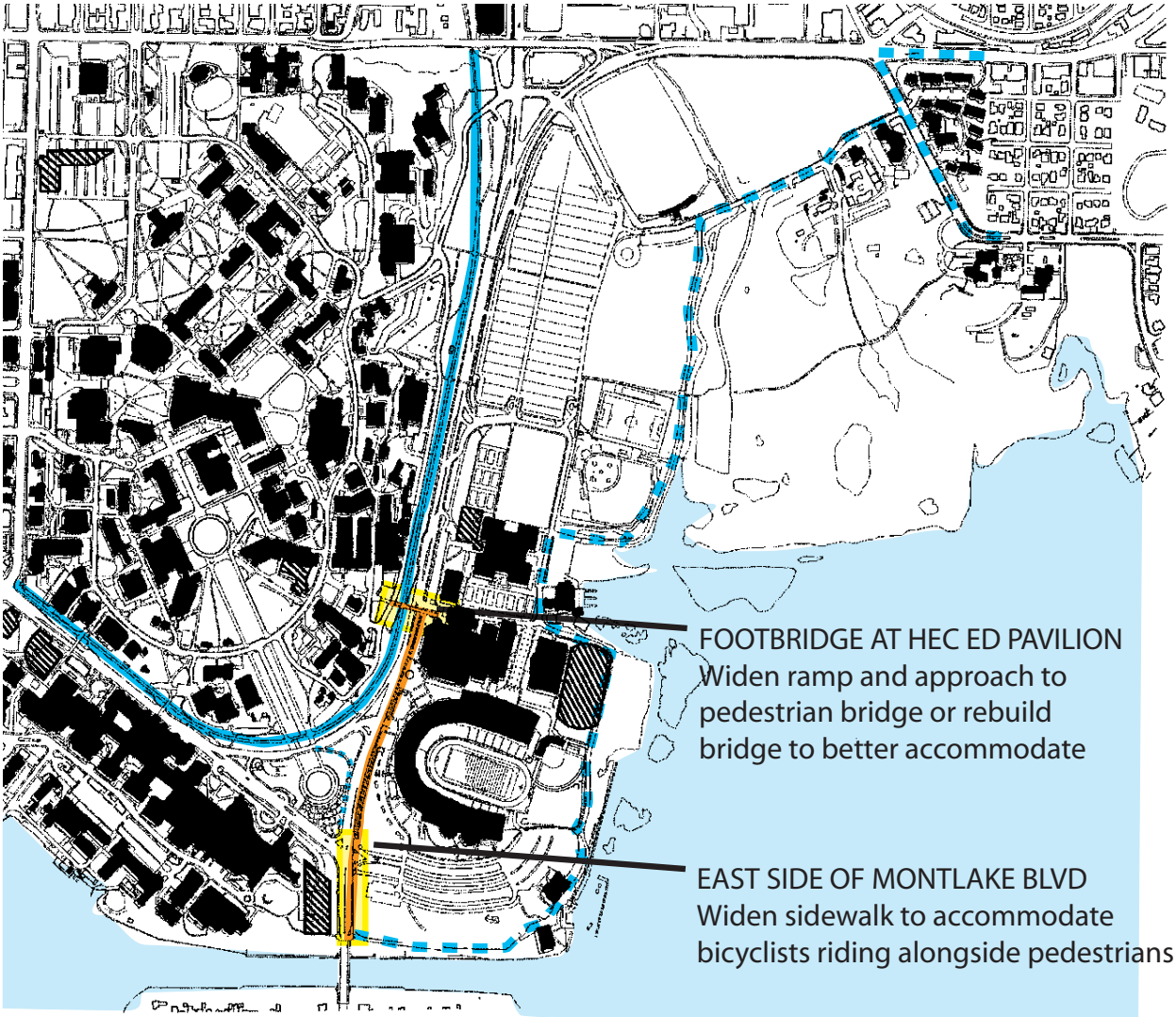
Figure 6

Nonmotorized System Opportunities
Montlake/UW Area

Concepts for improved bike/ped. connections between SR 520, University of Washington, and the Burke-GilmanTrail



LEGEND

Burke-Gilman Trail
Current bicycle route
Proposed improvement

Drawings not to scale
Plans represented are conceptual only

North-south Connections

1. Proposed SR 520 bike/pedestrian path to the Arboretum. A path is proposed to link with Lake Washington Boulevard in the short term and to the new trail on the east side of Lake Washington Boulevard as proposed in the Washington Park Arboretum Master Plan. A more integrated link between the Burke-Gilman to the north and the Arboretum/Lake Washington Boulevard to the south would create the possibility for a third loop in the Lake Washington Trail. Pedestrian connections to the trail out of Foster Island should also be preserved.

2. Montlake Cut Crossing. There are several options for improved connections to and across the Montlake Bridge (see Figures 5 and 6). Shelby and Hamlin Streets and Park Drive would continue to be the SR 520-Montlake Bridge connectors. This route, though less direct, keeps bike and vehicular traffic in the area somewhat separate.

   The connection between Montlake, the UW area, and the Burke Gilman Trail could be enhanced by widening of the sidewalks on the east side of Montlake Blvd (see Figure 5). Reconfiguring the cross-section of Montlake Blvd by narrowing the central median and adding striped bike lanes would provide a very direct route for bicycles, but would likely impact transit operations and potentially vehicular traffic on Montlake Blvd.

   A bike/pedestrian lane added to the existing Montlake Bridge (see Figure 6, Concept Alternative 1) is one option for crossing the Montlake Cut. The bridge's historic designation and technical constraints affect the feasibility of this concept. A second approach is to provide a dedicated bike/pedestrian/bridge across the cut to the east of the existing bridge. This could provide an opportunity for a "signature" bridge (Figure 6, Concept Alternative 2) designed to be in harmony with the historic Montlake Bridge. Boat traffic is the obvious issue with this option – height and grades on the bridge and frequency of opening would have to be addressed. The third concept is to create a bike/pedestrian lane on the proposed high bridge to Pacific Street (Figure 6, Concept Alternative 3). A concern here is that the grade of the bridge may exceed recommended grades for bicycle travel.

   The redevelopment of the MOHAI site with new bike/pedestrian paths would provide additional options for moving people north and south, and would further separate vehicle and bicycle traffic.

3. Changes to the intersection of Pacific and Montlake should include safety improvements such as pedestrian-friendly signal timing and refuge islands (Figure 7). To enhance the connection to the Burke-Gilman Trail, the ramp approach for the footbridge at Hec Edmundson Pavilion could be widened. If Montlake Blvd is widened, the footbridge should be rebuilt to better accommodate bicycles.

Transit connections

The Montlake flyer stop, which provides connections between Seattle and the Eastside, must be redesigned to better accommodate pedestrians, cyclists, and disabled transit users, in a convenient, safe, comfortable, accessible, and dignified manner. One of the key functions to consider is the ability of transit-users transferring from routes along Montlake Boulevard to reach the flyer stop in a direct way. The stop serves a high volume of riders and could better

serve them with additional signage, lighting, secure bicycle storage, and protection from traffic noise and grime. This area will likely remain a major nonmotorized transportation hub and as such the amenities described above can only serve to enhance and encourage transit use.

3.3 LAKE WASHINGTON

The addition of a bicycle/pedestrian facility on a new bridge across Lake Washington is probably the most significant nonmotorized improvement in that could be made in the SR 520 corridor. The ability to cross the bridge by bicycle or foot will likely encourage more trail users to use SR 520 for both commuting and recreational purposes.

Continuous facility

A key consideration for the placement of a bicycle facility on the bridge is the weather patterns on Lake Washington because cyclists are exposed to wind and wave action. During winter, prevailing winds come from the south and southwest, creating a great deal of chop and spray on the south side of the bridge. During summer, prevailing winds are from the north and northwest, but are far less severe. Putting the bicycle facility on the north side of the bridge (as on I-90) offers some protection to cyclists and pedestrians.

As described above, the bike facility is proposed to begin at Montlake and would touch down at Evergreen Point Hunts Point/Medina to connect with the parallel facility on the east side of the lake. Viewpoint pull-outs at a few places along the bridge could take advantage of the scenic beauty of this location and provide rest stops. Possible locations for these pullouts would be at Foster Island, Madison Park (see below), and other spots along the bridge where special views are identified (see Figure 1).

Cross-corridor connections

A bicycle–only ramp to Madison Park is being considered to provide better connections to the neighborhoods south of SR 520. The ramp would turn sharply and drop under the bridge near Foster Island, then head directly south, touching down at one of the street-ends just east of the Broadmoor Golf Course (such as 37th or 38th Avenue East). This connection would provide direct connection to the Madison Park-Arboretum neighborhoods, and an additional link to the popular Lake Washington Loop Trail along Lake Washington Boulevard.

A path between the Arboretum and Madison Park via the Broadmoor Golf Course has been studied by the City of Seattle. The path was not pursued because of wetland impacts and private property issues.

Transit connections

Alternatives for the Montlake interchange have not been finalized and there is question about which flyer stops will remain on the eastside. Nevertheless, the bike/pedestrian trail system should have a direct and convenient connection to the Montlake flyer stop, to the Evergreen Point bus stop in Hunts Point/Medina, or to other transit stops being considered.

3.4 EVERGREEN POINT TO BELLEVUE WAY NE

A bicycle/pedestrian trail network already exists through the Points communities: some parts are on a trail and some parts are on-street. Depending on the alignment changes of the highway, the existing Points Loop Trail can continue to serve cyclists and walkers with upgrades and other minor enhancements. The proposed SR 520 bicycle/pedestrian path on the floating bridge will be connected to the parallel facility.

Continuous facility

The existing Points Loop Trail could adequately serve as a regional nonmotorized route in the Points communities, if the neighborhoods support regional use of the trail. The trail would need to be upgraded to meet safety standards. Root heaves have made the existing path hazardous in several spots. Repaving and widening the trail to 12' where possible would accommodate increased bicycle traffic. Grade-separated crossings are proposed for Evergreen Point Drive, 84th Avenue NE, and 92nd Avenue NE and should be enhanced for safety. The roadblock on Points Drive should be widened to accommodate bicyclists.

If parts of the existing Points Loop Trail were removed to accommodate a new highway alignment, or if the Points communities do not want the Points Loop Trail to be used as a regional facility, a new trail within the right-of-way could be designed and built to proposed standards. Two options are being considered here. With the 6-lane highway alternative there is likely room for both the SR 520 bike/pedestrian path and the existing Points Loop Trail on the north side of the highway. With the 8-lane alignment the bike/pedestrian trail would be placed on the south side of SR 520. The trail could cross to the south under SR 520 at multiple points. Figure 8 illustrates both alternatives and shows the crossings at the Bellevue Avenue NE interchange and just west of the Evergreen Point Drive interchange.

Cross-corridor connections

Evergreen Point Road, 84th Avenue NE and 92nd Avenue NE provide regular cross-corridor connections and trail access points. Signs and/or being striped would create a safer environment for bicycle/pedestrian travel on these streets. The pedestrian bridge just east of Evergreen Point Road would be removed for any of the highway alternatives being considered. New lids in the area might replace that connection.

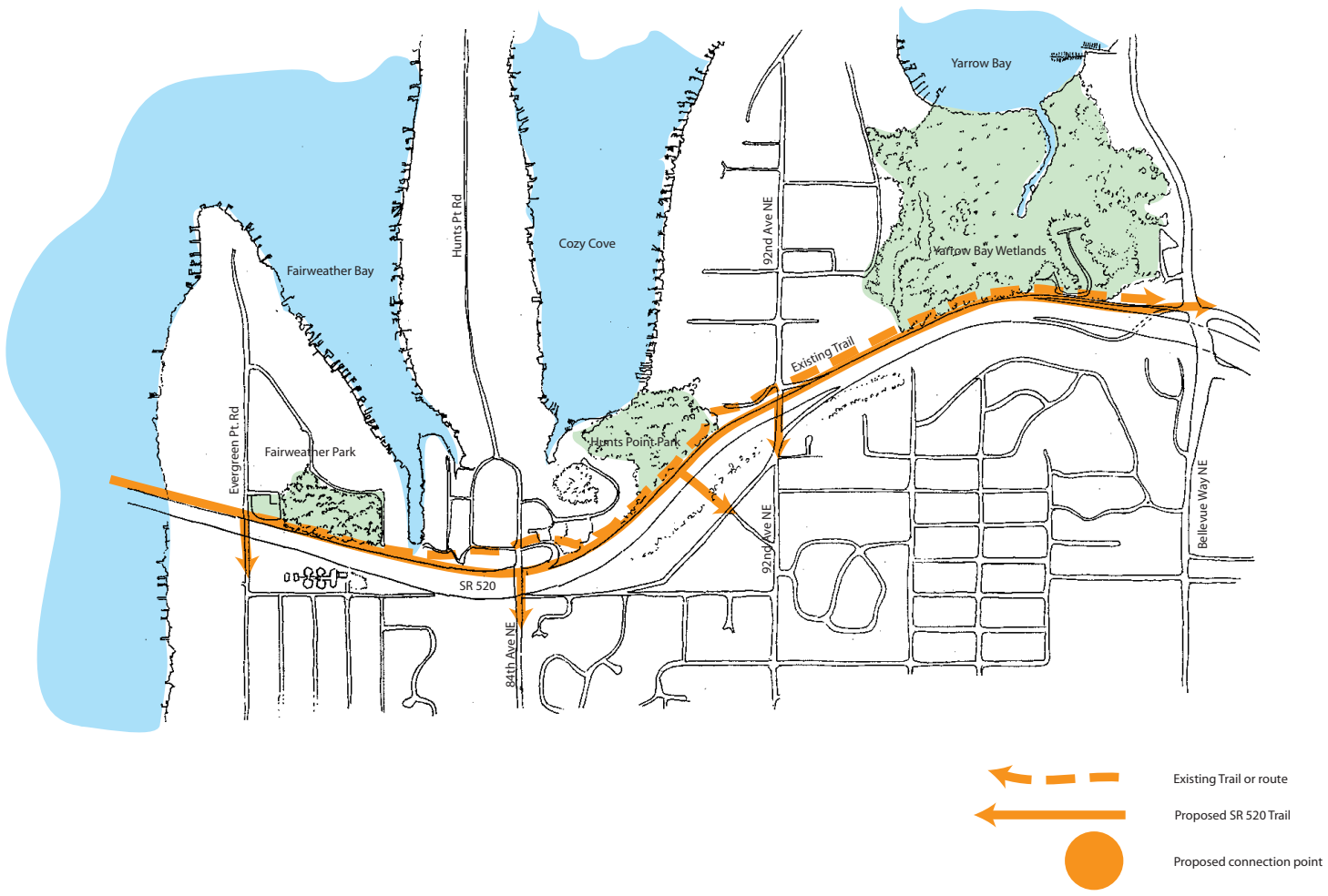
Transit connections

The proposed design includes relocating the Evergreen Point flyer stop to the median. It will be designed with improvements consistent with the Montlake flyer stop. In addition, as the Points Loop Trail is a primary means of access to this flyer stop, any redesign of the trail needs to incorporate this access. The flyer stop at 92nd Avenue NE will be removed due to low ridership and close proximity to median flyer stops at Evergreen Point and Bellevue Way. The City of Medina is considering closing the Medina Park and Ride lot located on Evergreen Point Drive adjacent to SR 520.

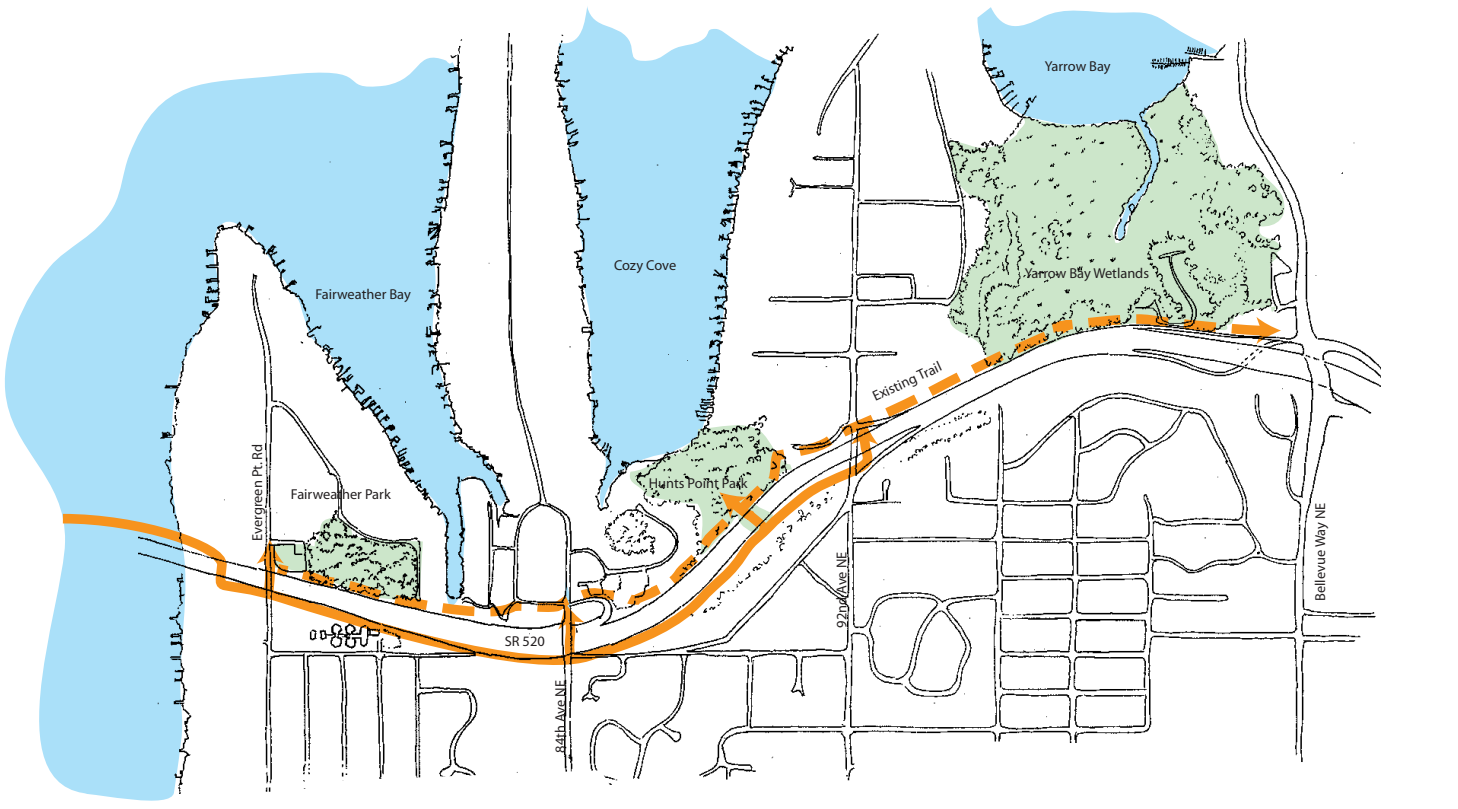
Nonmotorized System Opportunities
Points Communities Area

Concepts for improved bike/ped routes in the Points area

Concept Alternative 1
Regional trail on north side of
SR 520 with 6-lane alternative.



Concept Alternative 2
Regional trail on south side of SR
520 with 8-lane alternative



Drawings not to scale
Plans represented are conceptual only

Trans-Lake Washington Project

Fig8-points
5-07.02

Figure 8

3.5 BELLEVUE WAY NE TO WEST LAKE SAMMAMISH PARKWAY

The extension of the SR 520 bikeway from 148th Avenue NE to 124th Avenue NE continues the trail through most of Bellevue. The bike/pedestrian path should continue from 124th Avenue NE through the I-405 interchange to the SR 520/Bellevue Way interchange. Cross-corridor and transit connections are necessary in several areas. Figure 9 illustrates the options described below.

Continuous facility

The missing link in an otherwise continuous eastside facility is the stretch between 124th Avenue NE/NE 24th Street and Bellevue Way/NE Points Drive, where the Points Loop Trail begins. This segment includes the SR 520/I-405 interchange and the 108th Avenue NE exit. A dedicated bike/pedestrian trail is proposed along SR 520 to close the gap. An on-street connection along Northup Way is a feasible alternative, but mixes bicyclists and pedestrians with vehicular traffic. Grade-separated crossings are proposed Bellevue Way NE. In addition, the existing SR 520 bikeway will be modified to provide grade-separated crossings at 148th Avenue NE, NE 40th Street, and NE 51st Street.

Further to the east, the existing SR 520 Bikeway between West Lake Sammamish Parkway and 148th Avenue NE, as well as the extension currently under construction, would benefit greatly from a vegetative buffer between the trail and the highway.

Cross-corridor connections

Bellevue Way/Lake Washington Boulevard, 112th Avenue NE, 116th Avenue NE, and 140th Avenue NE are the major north-south bicycle routes intersecting SR 520. Other major cross-corridor routes are 148th Avenue NE (running north-south), NE 40th Street and NE 51st Street (both running east-west). In addition to safety improvements such as grade-separated trail/road crossings, each of these routes would benefit from improvements like signage and striping.

On-street bicycle lanes are planned for 140th Avenue NE from NE 24th Street North and from Bel-Red Road south, with shared roadway connections between.

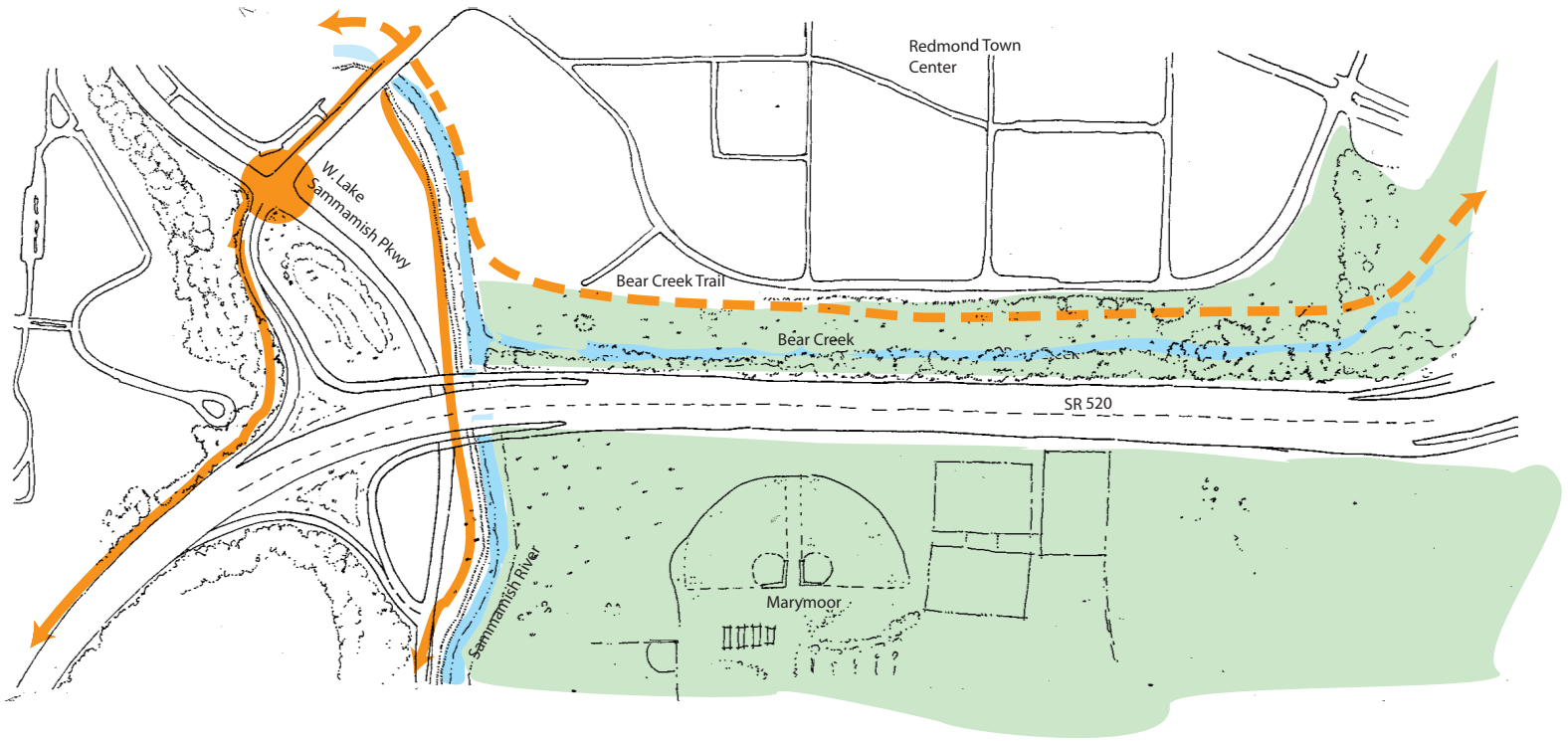
The Burlington Northern Railroad right-of-way will be another important cross-corridor connection, when plans for a trail corridor within or adjacent to the ROW are carried out. Any realignment of SR 520 and the I-405 interchange should preserve options for good connections between the SR 520 Bikeway and the BNSF Railroad trail.

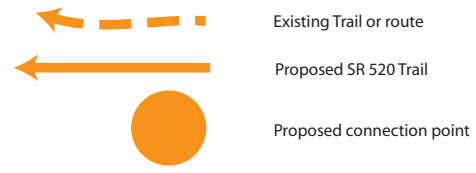
Because the street network in Bellevue is not continuous, the development of parallel routes and regular, frequent access points to the SR 520 Bikeway would greatly enhance the functionality of the nonmotorized network. In addition to major street crossings, additional access could include street-ends, such as 136th Place. The SR 520 extension now being constructed includes connections at 130th Avenue NE and NE 36th Street. Access might also be gained with ramps up the bridged crossings of the trail at 140th Avenue NE.

Nonmotorized System Opportunities
West Lake Sammamish Area

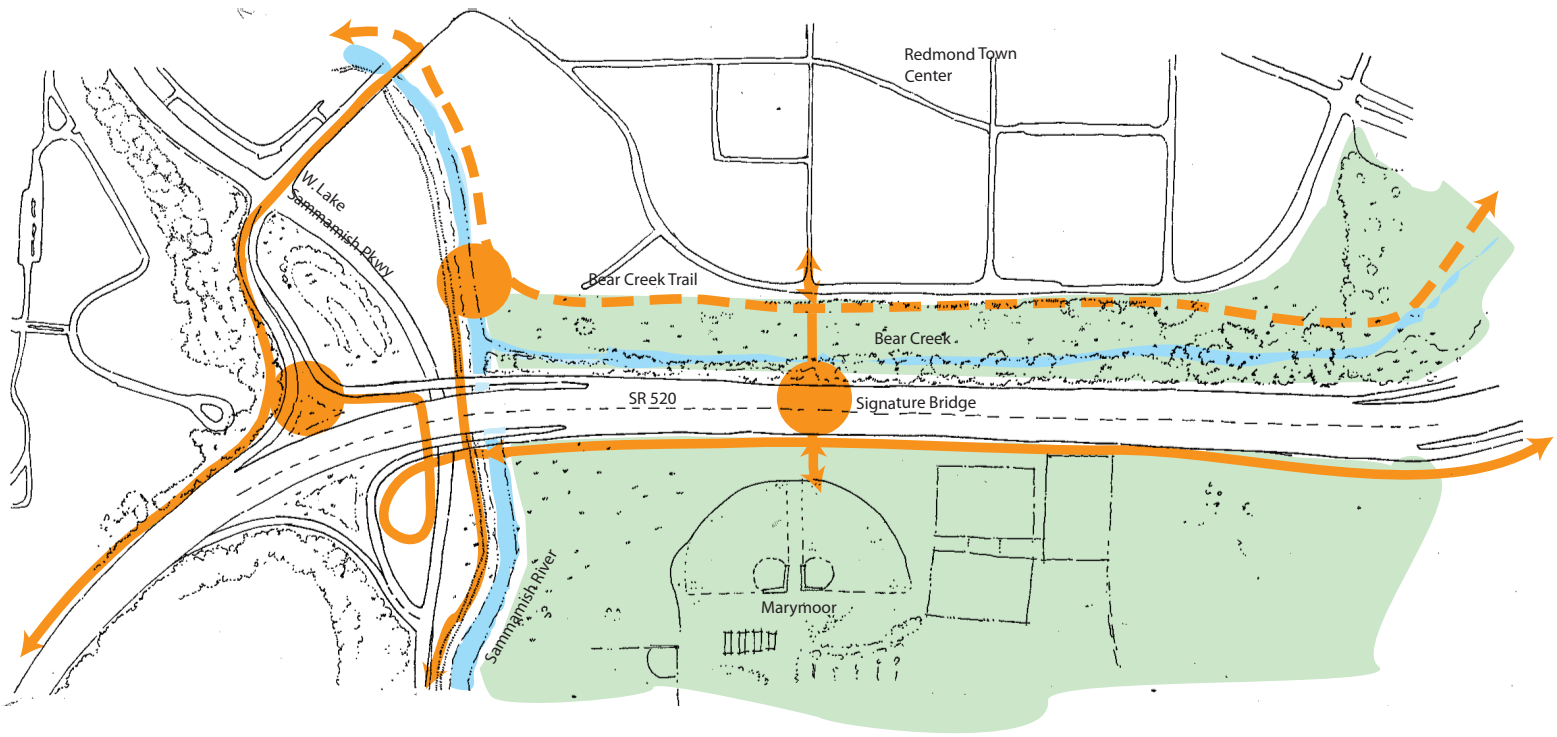
Concepts for improved bike/ped crossing at West Lake Sammamish Pkwy

Concept Alternative 1
Enhance existing bike/ped path
by connecting trails.





Concept Alternative 2
Add bike/ped path along south
side of SR 520



Drawings not to scale
Plans represented are conceptual only

Trans-Lake Washington Project

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Figure 9

Transit connections

The proposed design includes a median flyer stop at Bellevue Way NE. For the 8-lane alternative, a median flyer stop is proposed at NE 40th Street to service the Overlake Transit Center. Under the 6-lane alternative the transit center will be services via a direct access ramp at NE 31st Street.

There are several Park and Rides in this area:

South Kirkland Park and Ride at 108th Avenue NE and NE 38th Pl. (has bicycle facilities)
Northup Park and Ride at Northup Way and Lake Washington Blvd NE
St. Luke's Lutheran Church at Bellevue Way NE and NE 30th Place
Overlake Park and Ride at 152nd Avenue NE and NE 26th Street
Overlake Transit Center at 156th Avenue NE and NE 40th Street

Connections between the SR 520 Bikeway and these facilities should be enhanced with adequate sidewalks, striped bicycle lanes, and signage, especially on 108th Avenue NE (or another selected route) to the South Kirkland Park and Ride and on NE 40th Street to the Overlake Transit Center.

3.6 WEST LAKE SAMMAMISH PARKWAY TO REDMOND WAY

In Redmond, the existing SR 520 Bikeway and Redmond's growing network of trails serve the commuting and recreational community well. Improving connections to existing and future trails is the key to expanding the nonmotorized network in the area.

Continuous facility

The SR 520 Bikeway currently terminates at West Lake Sammamish Parkway in Redmond. Between W. Lake Sammamish Parkway and Redmond Way/SR 202 there are several existing and proposed bicycle/pedestrian connections:

- Existing east-west trails in Marymoor Park just south of SR 520.
- The existing Bear Creek Trail just north of SR 520.
- The City of Redmond is pursuing a rails-to-trails conversion of the BNSF Railroad right-of-way that would link the proposed East Lake Sammamish Trail, Redmond Town Center, and the Sammamish River Trail.
- King County is planning a new trail through the north end of Marymoor Park. This trail would link the Sammamish River Trail on the west side of Marymoor Park to the proposed East Lake Sammamish Trail on the east side of the park.

These trails serve recreational users primarily. A trail along the south side of SR 520 between West Lake Sammamish Parkway and Redmond Way (SR 202), and associated with the freeway, could provide more direct access for commuters.

Cross-corridor connections

Links with planned trails in the area are the most crucial improvements to be made in the Redmond area. In addition to the proposed East Lake Sammamish Trail and the possible BNSF Railroad trail, an extension of the Sammamish River Trail on the east side of the river, south of SR520, and the Bear Creek Trail and Greenway, beginning east of Redmond Town Center, will create a fairly comprehensive trail network around downtown Redmond.

Redmond will soon be making safety improvements to the on-street connection between the SR 520 Bikeway and the Sammamish River Trail via Leary Way. Additional improvements to be made are a new bicycle/pedestrian bridge across the river to link with the east-bank trail extension, and a bicycle/pedestrian crossing of SR 520 that would link Marymoor Park and Redmond Town Center, and connect to the Bear Creek Trail. The location of such a link has yet to be determined. This could be an opportunity to create a "signature" bridge, one that might serve as an icon for Redmond.

Transit connections

There are two transit facilities in the area, the existing Overlake Park and Ride at 152nd Avenue NE and NE 26th St and the proposed high capacity transit station at NE 40th St east of SR 520. Though outside the project area, connections between the SR 520 Bikeway and these facilities should be enhanced with adequate sidewalks, striped bicycle lanes, and signage. The City of Bellevue is considering an overpass of 152nd Avenue NE at 520, which would allow a direct connection between the Overlake Park and Ride and the Bikeway. If the overcrossing is not built, on-street bicycle/pedestrian improvements are recommended along 148th Avenue NE and NE 24th St.

4. SUMMARY

This report outlines the components of a nonmotorized transportation system that would increase regional mobility and enhance the livability of the communities adjacent to the SR 520 corridor. It is the belief that the transportation and livability benefits of providing nonmotorized facilities add value to neighborhoods and to the region as a whole. Nonmotorized systems can offer links and enhancements to communities that cannot come from other sources, specifically, from highway systems. Nonmotorized systems can, if carefully designed, alleviate the load on the highway system and re-connect communities that were severed by the highway.

Because each community along the corridor is unique, recommendations for the nonmotorized improvements and additions are considered on a case-by-case basis. Public involvement is a necessary ingredient in a well-designed nonmotorized transportation system. We would like to acknowledge the time and effort given by the SR 520 communities to the project design team in determining what matters to these communities. The ideas presented in this report are preliminary and will be refined as part of the design process and dialogue with the SR 520 communities.